

Serial No. 09/682,630

RD-29301

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of :
Jiang et.al :
Serial No. 09/682,630 : Group Art Unit: 1742
Filed: 10/01/2001 : Examiner: A Wessman
For Rhodium, Platinum, Palladium Alloy :

**DECLARATION OF MELVIN R. JACKSON
UNDER 37 CFR 1.132**

Honorable Commissioner of Patents and Trademarks,
Washington, DC 20231

S I R:

I, Melvin R. Jackson, declare:

I received the degree of Bachelor of Science in Metallurgical Engineering from Lehigh University in 1965, the degree of Master of Science in Metallurgy and Materials Science from Lehigh University in 1967, and the degree of Doctor of Philosophy in Metallurgy and Materials Engineering from Lehigh University in 1971. Following the receipt of my doctoral degree, I spent a year with the International Nickel Company at the Paul D. Merica Research Laboratory.

In 1972 I joined the research staff of General Electric Corporate Research and Development. My research efforts since joining General Electric have been in large part in the development of advanced high-temperature alloys. The development of alloys based on platinum-group metals has been one of my principal projects.

I am a joint inventor of the subject matter of the patent application noted above. The invention claimed in said application is a high temperature alloy comprising platinum-group metals, and articles made with said alloy. The subject patent application includes several claims directed to alloys comprising

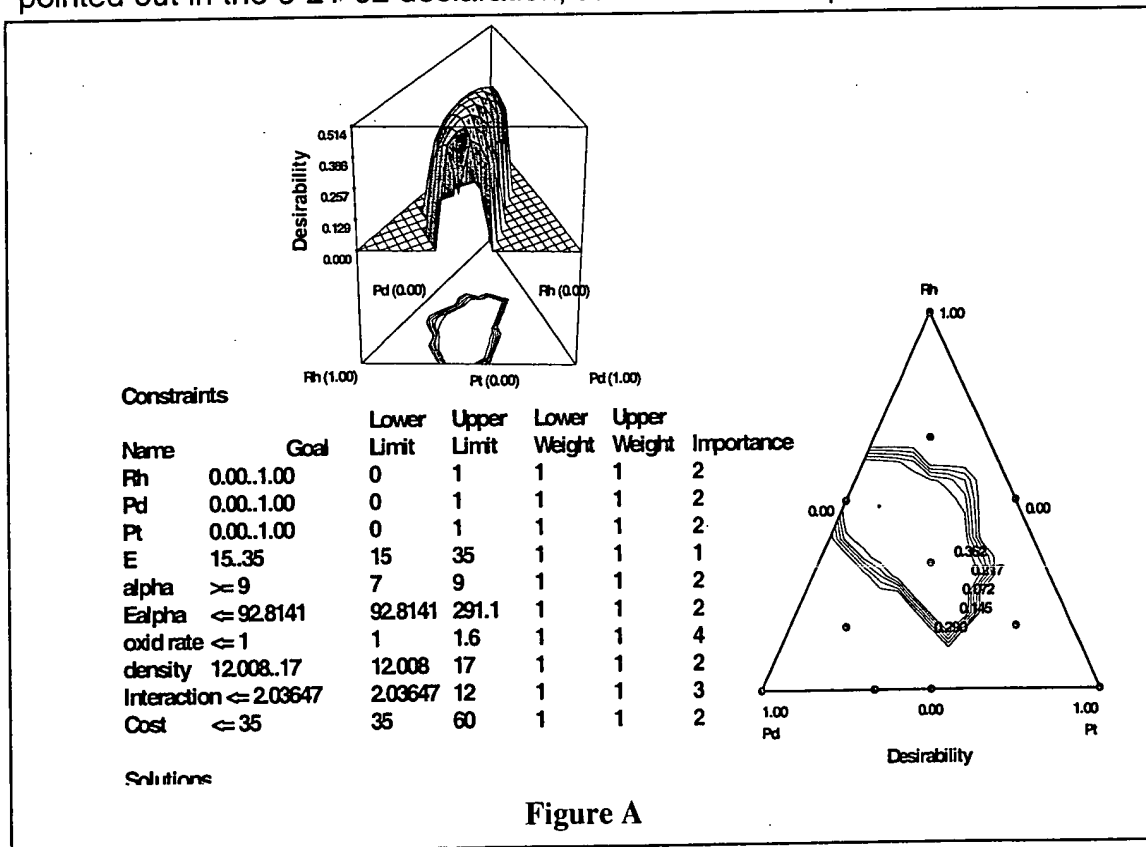
specific composition ranges of platinum, palladium, and rhodium. These specific ranges for the elements define an alloy composition region on the ternary Pt-Pd-Rh phase diagram as shown in Figures 1-3 of the subject patent application.

As stated in my declaration dated 21 June 2002 (herein referred to as "the 6-21-02 declaration") and submitted in previous prosecution of the present case pursuant to 37 CFR §1.132, the selection of alloys having the specific composition ranges recited in claims 35-58 of our application was the result of a comprehensive experimental program designed to discover alloys with desirable combinations of several characteristics that we deemed necessary for use in advanced gas turbine applications. Several alloy compositions evenly distributed throughout the Pt-Pd-Rh composition space were evaluated for a number of the properties listed above, while at the same time, specification criteria and relative weightings were determined for each of these properties based on expected needs of current and future gas turbine engines. For the broadest alloy composition region claimed in the present patent application, that recited in claim 35 and illustrated in Figure 1 of the present application, we applied the following specification criteria:

Modulus of Elasticity	>220 GPa
Hardness	>3.5 GPa
Oxidation Rate	<25 $\mu\text{m/hr.}$ at 1315°C
Density	<17 g/cc
Thermal expansion	>6.7 ppm/°F
Melting Temperature	>1720°C
Diffusion interaction(thickness of interfacial zone containing at least 10% substrate element)	<250 μm at 1000°C
Cost (at time of experiment) (note: this factor considered in some, but not all analyses)	35-60 \$/gram

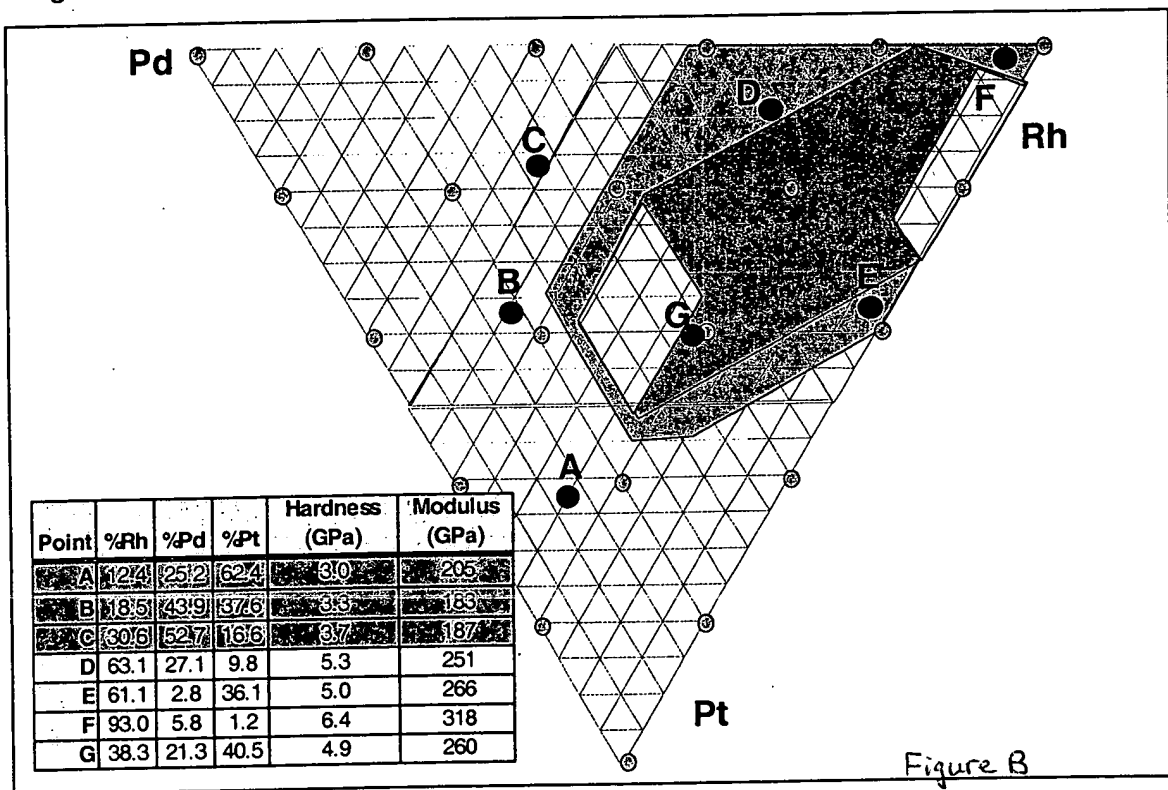
Several multi-dimensional, weighted optimization routines were then performed using the experimental data and specification limits as inputs to the commercial software package known as "Stat-Ease." By considering the trends and interactions in the measured data, along with the values and assigned weightings of the specification limits, the software calculated a composite figure of merit called "desirability" as a function of alloy composition, and numerically and graphically represented the desirability parameter.

An example of one particular optimization and its results is given in Figure A. Note that desirability is quite low outside the boundaries of the contour plot. The compositions inside the boundaries represent those alloys determined to be suitable based on the particular requirements we specified. As was pointed out in the 6-21-02 declaration, several of these optimization runs were



made using different numerical specification limits, depending on the intended use of the alloy composition. A combination of a number of complementary optimization studies determined the composition range recited in claim 35 of the present application, as was illustrated in Figure C of the 6-21-02 declaration.

Our data verified that this approach did indeed identify a range of alloy compositions within the overall Pt-Pd-Rh composition space that possesses the critical balance of properties required by next-generation turbine technology. Figure B shows the results for several alloys within the critical range recited in claim 35 of the present invention and compares them with three compositions outside the critical range. (Note: The colored areas in Figure B signify the approximate scope of the critical ranges claimed in the present application. Claim 35 recites approximately the total colored area, while dependent claims recite the smaller, differently colored regions contained within the overall critical range. The reader is referred to the claims of the patent application for the



actual scope of the critical regions.) For simplicity, data for only two of the several optimization criteria, namely hardness and modulus, are presented for comparison. None of the three compositions outside the critical range had a modulus greater than the lower specification value of 220 GPa, and two of those compositions had hardness less than the lower specification value of 3.5 GPa. Only the alloys contained within the critical range had the proper combination of

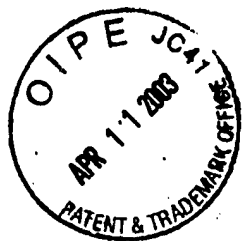
properties deemed critical by our analysis and experimentation. This result, which we could not have expected or predicted without performing this extensive experimental and analytical program, was reached via the analysis of our experimental data, coupled with our determination of the critical properties and values; the result was further verified by individual data as presented above.

The above discussion points out that the alloys claimed in the subject patent application have a particular composition range that we discovered to have uniquely useful combinations of critical properties for use in high temperature applications, such as, for example, gas turbine engines. We performed a series of weighted, multivariate optimization studies to balance multiple sets of competing trends in our experimental data, and found that the claimed range contained the alloys that met our particular standards for performance.

I finally declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Nov 12, 2002
Date

Mo'ns Robert Jackson
Signature



November 13, 2002

Amendment w/certificate of mailing; declaration.

The following ~~patent application~~ ~~xxxxxx~~
has been received by the Patent
Office on the date stamped below.

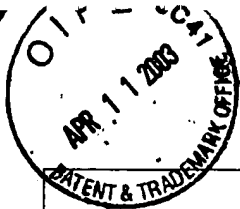
Inventor Jiang et al

Serial No. 09/682,630

Docket No. RD-29301



DiConza



94

Notice of Abandonment

Application No.

09/682,630

Examiner

Andrew E Wessman

Applicant(s)

LIANG ET AL.

Art Unit

1742

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

This application is abandoned in view of:

1. ☒ Applicant's failure to timely file a proper reply to the Office letter mailed on 13 August 2002.
 - (a) ☐ A reply was received on _____ (with a Certificate of Mailing or Transmission dated _____), which is after the expiration of the period for reply (including a total extension of time of _____ month(s)) which expired on _____.
 - (b) ☐ A proposed reply was received on _____, but it does not constitute a proper reply under 37 CFR 1.113 (a) to the final rejection.
(A proper reply under 37 CFR 1.113 to a final rejection consists only of: (1) a timely filed amendment which places the application in condition for allowance; (2) a timely filed Notice of Appeal (with appeal fee); or (3) a timely filed Request for Continued Examination (RCE) in compliance with 37 CFR 1.114).
 - (c) ☐ A reply was received on _____ but it does not constitute a proper reply, or a bona fide attempt at a proper reply, to the non-final rejection. See 37 CFR 1.85(a) and 1.111. (See explanation in box 7 below).
 - (d) ☒ No reply has been received.
2. ☐ Applicant's failure to timely pay the required issue fee and publication fee, if applicable, within the statutory period of three months from the mailing date of the Notice of Allowance (PTOL-85).
 - (a) ☐ The issue fee and publication fee, if applicable, was received on _____ (with a Certificate of Mailing or Transmission dated _____), which is after the expiration of the statutory period for payment of the issue fee (and publication fee) set in the Notice of Allowance (PTOL-85).
 - (b) ☐ The submitted fee of \$_____ is insufficient. A balance of \$_____ is due.
The issue fee required by 37 CFR 1.18 is \$_____. The publication fee, if required by 37 CFR 1.18(d), is \$_____.
 - (c) ☐ The issue fee and publication fee, if applicable, has not been received.
3. ☐ Applicant's failure to timely file corrected drawings as required by, and within the three-month period set in, the Notice of Allowability (PTO-37).
 - (a) ☐ Proposed corrected drawings were received on _____ (with a Certificate of Mailing or Transmission dated _____), which is after the expiration of the period for reply.
 - (b) ☐ No corrected drawings have been received.
4. ☐ The letter of express abandonment which is signed by the attorney or agent of record, the assignee of the entire interest, or all of the applicants.
5. ☐ The letter of express abandonment which is signed by an attorney or agent (acting in a representative capacity under 37 CFR 1.34(a)) upon the filing of a continuing application.
6. ☐ The decision by the Board of Patent Appeals and Interference rendered on _____ and because the period for seeking court review of the decision has expired and there are no allowed claims.
7. ☐ The reason(s) below:

ROY KING
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700

Petitions to revive under 37 CFR 1.137(a) or (b), or requests to withdraw the holding of abandonment under 37 CFR 1.181, should be promptly filed to minimize any negative effects on patent term.